NASA SBIR/STTR Technologies

Phase II Proposal
High Temp RTM Polyimide
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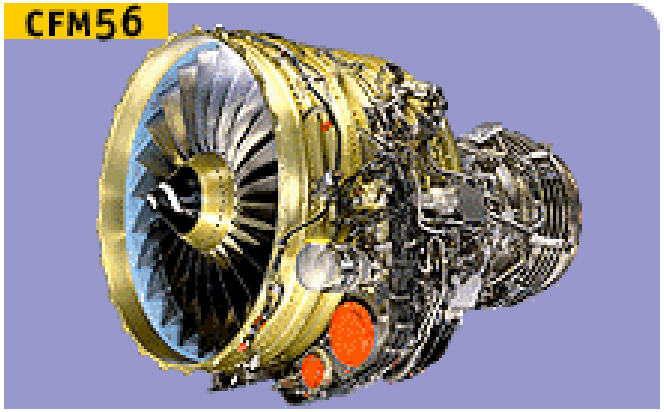
Objective

The overall objective of this Phase II program is to develop a high temperature RTM/VARTM processable polyimide with properties and stability that are comparable to or exceed that of PMR-15. The polyimide, and raw materials must be environmentally benign.

Approach

Optimize the best formulation from the Phase I program by varying MW and degree of branching. Replace PEPA end-cap with Nadic end-cap. Improve mechanical properties and Thermal Oxidative Stability through incorporation of nano-silicates.



GE Aircraft Engine with Parts made from PMR-15

Benefits

Development of new RTM/VARTM, environmentally friendly high temperature polyimide resins would allow "out-of-autoclave" manufacturing of large structures such as large composite tanks for the next generation Reusable Launch Vehicles. This enables the manufacture of larger, and more intricate parts, at a lower cost.

Phase I Results

- New monomers synthesized and characterized including a diamine, dianhydride, and branching agent
- Resins based on new monomers synthesized and tested
- Test results:
  - –All resins precursors have melt viscosities low enough for RTM/VARTM processing
  - –Best Tg is 316ºC

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